

MicroFUSION PARAMETERS

Setup Parameters

User List, Range: 1 to 199

[SP 1] Feedback Type

Units:	N/A
Minimum:	1
Maximum:	7
Default:	1 for SX, 2 for HX
Selections:	
1 =	Voltage Feedforward
2 =	RMS Voltage
3 =	AVG Voltage
4 =	RMS Current
5 =	AVG Current
6 =	Real Power
7 =	Apparent Power

[SP 2] Firing Mode

Units:	N/A
Minimum:	1
Maximum:	5
Default:	2 (1 for 3 Phase 2 Leg)
Selections:	
1 =	Zero Cross
2 =	Phase Angle
3 =	Zero Cross Transformer (ZCT)
4 =	HiPER
5 =	Fast Zero Cross (FZC)

[SP 3] Control Loop

Units:	N/A
Minimum:	0
Maximum:	1
Default:	1
Selections:	
0 =	Open Loop
1 =	Closed Loop

Closed loop is the normal operating mode. When open loop is selected, feedback compensation is disabled and the output is set directly by the setpoint (feedback is ignored)

[SP 4] Ramp Time

Units:	Seconds
Minimum:	0.0
Maximum:	300.0
Default:	0.0

The Ramp Time sets the time for the controller to command the output from zero (0) to the Full Scale Feedback value. When the time is set to zero, the ramp is disabled.

When the time is non-zero the Ramp is used whenever the setpoint starts from 0%.

[SP 5] Slew Rate

Units:	N/A
Minimum:	1
Maximum:	100
Default:	10

[SP 6] Reserved

N/A

[SP 7] ZCT Phase Angle to ZC Switch Thresh.

Units:	AC Line Cycles
Minimum:	5
Maximum:	20
Default:	20

[SP 8] Full Scale Voltage

Units:	Volts
Minimum:	5.0
Maximum:	690.0
Default:	480.0

Full Scale Voltage is used to scale the Meter Analog Output Signal for the Meter Output used to represent Load Voltage (Default for Meter output 2).

[SP 9] Full Scale Current

Units:	Amps
Minimum:	1.0
Maximum:	400.0
Default:	Set to Amp Rating

Full Scale Current is set to the maximum allowable Output Current commanded by the Setpoint. This value is also used to scale the Meter Analog Output signal for the Meter Output used to represent Load Current (Default for Meter Output 1).

[SP 10] Full Scale Power	
Units:	kW
Minimum:	0.4
Maximum:	828.0
Default:	192.0 (Set according to Amp Rating & 480 V)
Full Scale Power is used to scale the Meter Analog Output Signal for a Meter Output used to represent Load Power.	

[SP 11] Voltage Limit	
Units:	Volts (RMS or AVG)
Minimum:	4.0
Maximum:	724.5
Default:	600.0
Voltage Limit is used to set the maximum allowable Output Voltage. The controller will not allow the Output Voltage to be higher than this setting.	

[SP 12] Current Limit	
Units:	Amps (RMS or AVG)
Minimum:	8.0
Maximum:	420.0
Default:	420.0 (Set to 105% of Amp Rating)
Current Limit sets the Absolute Maximum Output current allowed by the controller. The value set for Current Limit is 105% of the Full Scale Current value.	

[SP 13] Current Limit Type	
Units:	N/A
Minimum:	1
Maximum:	2
Default:	1
Selections:	
1 =	RMS
2 =	AVG

[SP 14] Over Current Trip	
Units:	Amps RMS
Minimum:	2
Maximum:	1800
Default:	175% for Phase Angle, 400% for Zero Cross
Over Current Trip sets the Threshold for the Output Current such that if the output current reaches this threshold the controller will immediately shut down the output and transition to FAULT state.	

[SP 15] Power Limit	
Units:	kW
Minimum:	0.4
Maximum:	869.4
Default:	Set to 105% of Amp Rating & 480 V
Power Limit sets the Absolute Maximum Output Power allowed by the controller.	

[SP 16] Relay 1 Alarm Mask	
Units:	N/A
Minimum:	0000_0000_0000_0000
Maximum:	1111_1111_1111_1111
Default:	0000_0000_0000_0110 = 24576
Bit Definitions:	
BIT 15	Partial Load Fault
BIT 14	Heatsink Over Temp.
BIT 13	Current Trip
BIT 12	Heatsink High Temp. Warning
BIT 11	AC Line Phase Loss
BIT 10	Shorted SCR
BIT 9	Power Limit
BIT 8	Current Limit
BIT 7	Voltage Limit
BIT 6	Digital RUN Enable (RUN State Request)
BIT 5	TBD
BIT 4	3 Phase Load Imbalance
BIT 3	Low Output
BIT 2	Deviation Alarm
BIT 1	Output % High or Tap Change Up
BIT 0	Output % Low or Tap Change Down

Relay 1 Alarm Mask determines the Alarm Events that will energize the on-board relay. When a Bit is set to 1 and the corresponding event occurs the relay will energize.

[SP 17] Reserved	
N/A	

[SP 18] Deviation Band	
Units:	Percent
Minimum:	0.00
Maximum:	100.00
Default:	100.00

[SP 19] Feedback Source	
Units:	N/A
Minimum:	1
Maximum:	4
Default:	1
Selections:	
1 =	Internal Feedback Signal (V, I, P)
2 =	Analog Input 1
3 =	Analog Input 2
4 =	Transducer Card

[SP 20] Over-Current Trip Retry Setting	
Units:	Retry Count
Minimum:	0
Maximum:	3
Default:	0

Use the Over-Current Trip Retry Setting [SP 20] to allow the controller to automatically clear the fault and restart after an Over-Current Trip Fault Event. This parameter sets the number of times the controller will retry after an Over-Current Trip Event. The controller will latch into fault state after attempting the number of retries set by this parameter.

[SP 21] Heater Bakeout Time	
Units:	Minutes
Minimum:	1
Maximum:	10000
Default:	60

Cannot be changed when heater bakeout is enabled and the controller is in RUN state.

[SP 22] Heater Bakeout Voltage Limit	
Units:	Volts (RMS or AVG)
Minimum:	4.0
Maximum:	660.0
Default:	600.0

[SP 23] Heater Bakeout Current Trip	
Units:	Amps RMS
Minimum:	50% of Current Rating
Maximum:	450% of Current Rating
Default:	150% of Current Rating

[SP 24] Heater Bakeout Enable (RAM)	
Units:	N/A
Minimum:	0
Maximum:	1
Default:	0 (Refer to [SP 25] for Power Up Default)
Selections:	
0 =	Disable
1 =	Enable

[SP 25] Heater Bakeout Enable with Power-Cycle	
Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	Disabled at Power-Up
1 =	Enable Heater Bake out at Power-Up

[SP 26] Current Limit Source	
Units:	N/A
Minimum:	1
Maximum:	3
Default:	1
Selections:	
1 =	[SP 12] Current Limit
2 =	Analog Input 1
3 =	Analog Input 2

[SP 27] Setpoint Trigger Threshold	
Units:	%
Minimum:	0.00
Maximum:	100.00
Default:	0.00

When the active setpoint is at or below this threshold, the MicroFUSION will hold load resistance at the last calculated resistance value and periodically increase the controllers output, calculate the load resistance, and then return the output back to follow the active setpoint.

[SP 28] Pulse Level	
Units:	Volts
Minimum:	0.50
Maximum:	600.00 (Limited by [SP 8])
Default:	10.00

When the output is at or below the trigger threshold, the controller will pulse the voltage output to the entered value.

[SP 29] Pulse Frequency

Units:	Seconds
Minimum:	0.1
Maximum:	3600.0
Default:	1.0

This parameter sets the amount of time between increases in power output and resistance calculation, when the setpoint is at or below the threshold [SP 27].

[SP 30] Pulse Duration

Units:	Cycles
Minimum:	1
Maximum:	999
Default:	16

Sets the number of AC Line cycles for the increased power controller output and load resistance calculation when the setpoint is at or below the threshold.

[SP 31] Pulse Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0

Selections:	
0 =	Disabled (OFF)
1 =	Enabled (ON)

Enables or Disables the periodic power increases, which are paired with load resistance sampling and hold calculations.

[SP 32] Pulse at Zero Setpoint Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0

Selections:	
0 =	Disabled (OFF)
1 =	Enabled (ON)

This parameter enables or disables the periodic power controller output increases with load resistance sample and hold calculation. If disabled, the controller will NOT pulse the output if the setpoint is zero. Enable this parameter to allow the controller to pulse the output when the setpoint is zero, and the Pulse Enable [SP 31] is also set to enable.

[SP 33] HiPER Threshold

Units:	Counts
Minimum:	10
Maximum:	5000
Default:	833 (833 x 180° / 10000 = 14.994°)

HiPER Threshold sets the phase angle threshold at which the controller will switch from phase angle firing to HiPER firing, or from HiPER to Phase Angle. Above this threshold, the controller will fire in phase angle, below this value the controller will enter HiPER and fire with the phase angle locked at the threshold.

[SP 34] Partial Load Fault Detection Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0

Selections:	
0 =	Disabled (OFF)
1 =	Enabled (ON)

Partial load fault detects a change in resistance of the load. This parameter enables or disables the partial load fault functionality.

[SP 35] Partial Load Fault Tolerance A

Units:	%
Minimum:	0.0
Maximum:	100.0
Default:	8.0

This parameter designates the percentage of allowable deviation from the expect load resistance. If the deviation is outside of the tolerance, the Partial Load Fault warning will trigger for phase A.

[SP 36] Partial Load Fault Tolerance B

Units:	%
Minimum:	0.0
Maximum:	100.0
Default:	8.0

This parameter designates the percentage of allowable deviation from the expect load resistance. If the deviation is outside of the tolerance, the Partial Load Fault warning will trigger for phase B.

[SP 37] Partial Load Fault Tolerance C

Units:	%
Minimum:	0.0
Maximum:	100.0
Default:	8.0

This parameter designates the percentage of allowable deviation from the expect load resistance. If the deviation is outside of the tolerance, the Partial Load Fault warning will trigger for phase C.

[SP 38] Partial Load Fault Target Resistance A

Units:	Ohms
Minimum:	0.00
Maximum:	655.35
Default:	8.00

The expected load resistance for phase A when using Single Point mode, as set by [SP 42].

[SP 39] Partial Load Fault Target Resistance B

Units:	Ohms
Minimum:	0.00
Maximum:	655.35
Default:	8.00

The expected load resistance for phase B when using Single Point mode, as set by [SP 42].

[SP 40] Partial Load Fault Target Resistance C

Units:	Ohms
Minimum:	0.00
Maximum:	655.35
Default:	8.00

The expected load resistance for phase C when using Single Point mode, as set by [SP 42].

[SP 41] Partial Load Fault Teach

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	OFF
1 =	Start (ON)

The Teach procedure will save the resistance values of the load, which will be used to determine if a Partial Load Fault has occurred. Controller must be in RUN state to enable the Teach function.

When Partial Load Fault is in Single Point mode [SP 42], the teach mode will save the current resistance of the load, which will be used throughout the entire output range. The resistance values are saved to [SP 38, 39, & 40]. In order to record accurate resistance, the controller must apply power to the load.

When Partial Load Fault is in Ramp Down mode [SP 42], Teach mode will apply power to the load and record the resistance values while ramping down the controller's output. This is useful for loads where the resistance changes throughout the output range. Specify the max Setpoint value [SP 43], that is used for the ramp down in order to limit the power applied to the load. The Teach procedure in Ramp Down mode will take about 1 minute.

[SP 42] Partial Load Fault Teach Mode

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	Single Point
1 =	Ramp Down

Specifies the mode used for Partial Load Fault detection.

Single Point: a single resistance value will be used throughout the entire output range when evaluating whether a Partial Load Fault has occurred. This resistance value is specified using [SP 36].

Ramp Down: multiple resistance values will be used throughout the controller's output range. To use Ramp Down, the Partial Load Fault functionality must be initialized using the Teach parameter [SP 37].

[SP 43] Partial Load Fault Teach Maximum Setpoint

Units:	N/A
Minimum:	0
Maximum:	64000 (See [SP 115])
Default:	10000

The maximum Setpoint to use during the Teach procedure when in Ramp Down mode. During the Teach procedure, the controllers output will begin at this Setpoint and ramp down from there.

[SP 44] Over Current Trip Retry Delay Time

Units:	Second
Minimum:	0
Maximum:	20
Default:	0

This will add time delay between an Over Current Trip event and the automatic retry. This delay is only active if the value for Over Current Trip retries [SP 20] is not zero (0).

[SP 45] Partial Load Fault Teach Min. Setpoint

Units:	N/A
Minimum:	0
Maximum:	64000 (See [SP 115] Setpoint Resolution Select)
Default:	500

The minimum Setpoint to use during the Teach procedure when in Ramp Down mode. During the Teach procedure, the controllers output will begin at Maximum Setpoint [SP 43] and ramp down to this setpoint.

[SP 46] Load Resistance at Zero Output

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	LOW = 0.00
1 =	HIGH = 655.35

This parameter sets the load resistance value, assigned when the controller output is zero (0), when the controller is not in RUN state or is disabled due to PLL Lock Loss or Line Phase Loss.

[SP 47 - 83]

Reserved

[SP 84] Hero Mode Enable

Units:	<u>Enabling Hero Mode will VOID MFG warranty</u>
Minimum:	0
Maximum:	1 (Ignore Temperature Alarms) *
Default:	0
Selections:	
0 =	0 = Disabled
1 =	1 = Enabled

* A heat sink temperature fault will still be logged during an over-temperature condition.

[SP 85] System Relay Mask

Units:	N/A
Minimum:	0000_0000_0000_0000
Maximum:	1111_1111_1111_1111
Default:	0000_0000_0000_0000 = 0
Bit Definitions:	
BIT 15	TBD
BIT 14	TBD
BIT 13	TBD
BIT 12	TBD
BIT 11	TBD
BIT 10	TBD
BIT 9	TBD
BIT 8	TBD
BIT 7	TBD
BIT 6	RUN Enable via Switch Input
BIT 5	In RUN state
BIT 4	PLL Lock Loss

[SP 85] System Relay Mask

BIT 3	Watchdog Timeout
BIT 2	Memory Error
BIT 1	Communications Error
BIT 0	Processor Error Trap

System Alarm Mask determines the system events that will energize the on-board relay.

[SP 86] Load Current C Source (for 3 Phase 2-Leg)

Units:	N/A
Minimum:	0
Maximum:	2
Default:	0
Selections:	
0 =	Internal Feedback
1 =	Analog Input 1
2 =	Analog Input 2

[SP 87] 3 Phase Load Current Imbalance Threshold

Units:	%
Minimum:	0
Maximum:	200
Default:	0 (Disabled)

[SP 89] Analog Input 2 Function Select

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	None
1 =	Scale Analog Input 1

[SP 90] Analog Input 1 Type

Units:	N/A
Minimum:	1
Maximum:	2
Default:	2
Selections:	
1 =	Voltage Input
2 =	Current Input

Analog Input type is used to inform the controller about the type of signal that is connected to the analog input terminals. Set to voltage if the signal is 0 to 10 Volts. Set to current if the signal is 0 to 20 mA.

[SP 91] Analog Input 1 Lo Command

Units:	V, mA
Minimum:	-5.00
Maximum:	25.00
Default:	4.00

This sets the analog input signal level that corresponds to the command value set by [SP 92] Analog Input Lo Output.

[SP 92] Analog Input 1 Lo Output

Units:	% (Based on Full Scale value)
Minimum:	0.00
Maximum:	125.00
Default:	0.00

This sets the commanded percent, of the Full Scale Feedback Value for the Feedback Type selected, that corresponds to the signal level set by [SP 91] Analog Input Lo Command.

[SP 93] Analog Input 1 Hi Command

Units:	V, mA
Minimum:	-5.00
Maximum:	25.00
Default:	20.00

This sets the Analog Input Signal level that corresponds to the command value set by [SP 94] Analog Input Hi Output.

[SP 94] Analog Input 1 Hi Output

Units:	% (Based on Full Scale value)
Minimum:	0.00
Maximum:	125.00
Default:	100.00

This sets the commanded percent, of the Full Scale Feedback Value for the Feedback Type selected, that corresponds to the signal level set by the [SP 93] Analog Input Hi Command.

[SP 95] Analog Input 2 Type

Units:	N/A
Minimum:	1
Maximum:	2
Default:	1
Selections:	
1 =	Voltage Input
2 =	Current Input

Analog Input type is used to inform the controller about the type of signal that is connected to the analog input terminals. Set to voltage if the signal is 0 to 10 Volts. Set to current if the signal is 0 to 20 mA.

[SP 96] Analog Input 2 Lo Command

Units:	V, mA
Minimum:	-5.00
Maximum:	25.00
Default:	0.00

This sets the analog input signal level that corresponds to the command value set by [SP 97] Analog Input Lo Output.

[SP 97] Analog Input 2 Lo Output

Units:	% (Based on Full Scale value)
Minimum:	0.00
Maximum:	125.00
Default:	0.00

This sets the commanded percent, of the Full Scale Feedback Value for the Feedback Type selected, that corresponds to the signal level set by [SP 96] Analog Input Lo Command.

[SP 98] Analog Input 2 Hi Command

Units:	V, mA
Minimum:	-5.00
Maximum:	25.00
Default:	5.00

This sets the Analog Input Signal level that corresponds to the command value set by [SP 99] Analog Input Hi Output.

[SP 99] Analog Input 2 Hi Output

Units:	% (Based on Full Scale value)
Minimum:	0.00
Maximum:	125.00
Default:	100.00

This sets the commanded percent, of the Full Scale Feedback Value for the Feedback Type selected, that corresponds to the signal level set by the [SP 98] Analog Input Hi Command.

[SP 100] Fieldbus Setpoint [RAM]

Units:	NONE (Counts)
Minimum:	0
Maximum:	64000 (See [SP 115] Setpoint Resolution Select)
Default:	0

[SP 101] Keypad Setpoint [RAM]

Units:	NONE (Counts)
Minimum:	0
Maximum:	64000 (See [SP 115] Setpoint Resolution Select)
Default:	0

[SP 102] Setpoint 1 Source

Units:	N/A
Minimum:	1
Maximum:	7
Default:	1
Selections:	
1 =	Analog Input 1
2 =	Analog Input 2
3 =	Fieldbus Setpoint
4 =	Keypad Setpoint
5 =	PWM Setpoint
6 =	FBU Setpoint
7 =	EE Setpoint

Default = 3, when the Digital Fieldbus option is Modbus TCP, EtherNet/IP, or PROFINET.

[SP 103] Setpoint 2 Source

Units:	N/A
Minimum:	1
Maximum:	7
Default:	2
Selections:	
1 =	Analog Input 1
2 =	Analog Input 2
3 =	Fieldbus Setpoint
4 =	Keypad Setpoint
5 =	PWM Setpoint
6 =	FBU Setpoint
7 =	EE Setpoint

Default = 1, when Modbus TCP, EtherNet/IP or Profinet; Default = 4, if Analog Setpoint 2 feature is not enabled

[SP 104] Control Setpoint Select

Units:	N/A
Minimum:	1
Maximum:	2
Default:	1
Selections:	
1 =	Setpoint 1 Source
2 =	Setpoint 2 Source

This determines the Setpoint Source that is used as the setpoint for the Control Loop (See [SP 103] and [SP 104]).

[SP 105] Feedback Unit Setpoint (HI Word) [RAM]

[SP 106] Feedback Unit Setpoint (LO Word) [RAM]

Units:	V, A, W
Minimum:	0.0 or 0
Maximum:	* Limited by the Full Scale setting for the feedback type selection
Default:	0.0 or 0

The Feedback unit setpoint is entered in units of the feedback type selected by [SP 1]. When either Voltage or Current is selected as the feedback type, this parameter has one (1) digit to the right of the decimal point. When Power is selected as the feedback type, there are no digits to the right of the decimal point (entry resolution is 1 watt).

[SP 107] EE Setpoint

Units:	NONE (Counts)
Minimum:	0
Maximum:	64000 (see [SP 115])
Default:	0

This setpoint value is saved to EEPROM each time it is changed. The value of this setpoint is retained through a power cycle.

[SP 108] Network Timeout Setpoint

Units:	NONE (Counts)
Minimum:	0.00
Maximum:	See [SP 115] Setpoint Resolution Select
Default:	0

This sets the commanded percent, of the Full Scale Feedback Value for the Feedback Type selected, used as the Control Loop setpoint when [SP 128] Network Timeout Action is set to 2 = use Network Timeout Setpoint and the Heartbeat Timer (See [SP 125]) expires resulting in a Network Timeout Event.

[SP 109] Clear Error Latch [RAM]

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	Do Not Clear
1 =	Clear the Latch Bits to 0

[SP 110] Clear Fault [RAM]

Units:	N/A
Minimum:	0

[SP 110] Clear Fault [RAM]

Maximum:	1
Default:	0
Selections:	
0 =	Do Not Clear
1 =	Clear the Fault State

[SP 111] I / O Power Supply Failure Inhibit Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	1
Selections:	
0 =	Disable
1 =	Enable

When [SP 111] is set to Enable (1) and the I / O Power Supply fails, an inhibit alarm will be indicated and the controller will transition to FAULT state which will shut down the output. The FAULT state shut down can be disabled by setting this parameter to Disable (0). The inhibit alarm will still be present, however when set to Disable (0), the controller will not be put into FAULT state.

[SP 112] Reserved

Reserved

[SP 113] Low Output Alarm Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	1
Selections:	
0 =	Disable
1 =	Enable

[SP 114] Partial Load Fault Alarm Delay Time

Units:	Seconds
Minimum:	1
Maximum:	120
Default:	60

[SP 115] Setpoint Resolution Select

Units:	N/A
Minimum:	1

Locked out during RUN state

[SP 115] Setpoint Resolution Select

Maximum:	2
Default:	1
Selections:	
1 =	LOW = 10000
2 =	HIGH = 64000

Locked out during RUN state

[SP 116] Display Auto Scroll Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	1
Selections:	
0 =	Disabled
1 =	Enabled

[SP 117] Reserved

Reserved

[SP 118] MAC ID (CCI Link)

Units:	N/A
Minimum:	0
Maximum:	63
Default:	63

[SP 119] Auto Configuration

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	Disabled
1 =	Enabled

[SP 120] Local Mode Enabled [RAM]

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0 (Value at Power-Up unless controlled by GP Input)
Selections:	
0 =	OFF (Not Enabled)
1 =	ON (Enabled)

[SP 121 -124]

Reserved

[SP 125] Communications Heartbeat Time

Units:	Seconds
Minimum:	0
Maximum:	65535
Default:	0

Interval (in seconds) that the controller will wait for a message packet. On the first two consecutive timeouts the controller will reset the XPort comm module. A third timeout triggers the Timeout Action [SP 128].

[SP 126] IP Address HI

Units:	N/A	
Minimum:	0	(0. 0)
Maximum:	65535	(255.255)
Default:	65535	

This sets the two most significant octets of the controller's base IP Address.

[SP 127] IP Address LO

Units:	N/A	
Minimum:	0	(0. 0)
Maximum:	65535	(255.255)
Default:	65535	

This sets the two least significant octets of the controller's base IP Address.

[SP 128] Network Timeout Action

Units:	N/A
Minimum:	0
Maximum:	2
Default:	0
Selections:	
0 =	NONE, Continue
1 =	STOP, Fault Shutdown
2 =	Use Network Timeout Setpoint [SP 108]

This setting determines how the controller will react to a Network Timeout Event that occurs when the Heartbeat Timer expires waiting for a message packet.
A setting of 0 = NONE will result in no action: the controller will indicate the Timeout, but continue to operate as before.
A setting of 1 = STOP will result in the controller immediately transitioning to FAULT shutdown state with the output power OFF when a timeout occurs.
When this parameter is set to 2 the controller will use the Network Timeout Setpoint [SP 108] immediately after a timeout occurs, until the timeout is cleared by the reception of another message packet.

[SP 129] Digital Run/Stop [RAM]

Units:	N/A
Minimum:	0
Maximum:	1
Default:	See [XP 3401]
Selections:	
0 =	STOP
1 =	RUN

This may be used to command the controller into RUN or STOP state via digital communications (USB or Ethernet/Modbus TCP). This parameter is used in conjunction with the RUN/STOP switch input on the P1 connector (PIN 9).

[SP 130] Relay Normal State

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	OFF (De-Energized)
1 =	ON (Energized)

[SP 131] SYNC-GUARD Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	OFF (not enabled)
1 =	ON (enabled)

[SP 132] Shorted SCR Check Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	OFF
1 =	ON

[SP 133] GP Digital Input Function

Units:	N/A
Minimum:	0
Maximum:	5
Default:	0
Selections:	
0 =	NONE

[SP 133] GP Digital Input Function

1 =	[SP 104] Control Setpoint Select
2 =	[SP 3] Control Loop
3 =	[SP 24] Heater Bakeout Enable
4 =	[SP 120] Local Mode Enable
5 =	[SP 2] Phase Angle Firing Mode

[SP 134] Reserved

Reserved

[SP 135] Communications Watchdog Time

Ethernet-IP and Profinet only

Units:	Seconds
Minimum:	0 (disabled / no timeout)
Maximum:	65535
Default:	0

Master PLC must toggle bit 2 or write a new value for Digital Run Enable before time expires. Timer does not start until the first bit-toggle is detected. First timeout event will cause controller to reset the communications xport module, the Network Timeout Action [SP-128] will be triggered on a second consecutive event.

[SP 136] Analog Input 1 Monitor Full Scale Value

Units:	N/A
Minimum:	0.0
Maximum:	3200.0
Default:	1000.0

[SP 137] Analog Input 2 Monitor Full Scale Value

Units:	N/A
Minimum:	0.0
Maximum:	3200.0
Default:	1000.0

[SP 138] IP Shadow HI

Units:	N/A
Minimum:	0 (.0 .0)
Maximum:	65535 (255.255)
Default:	65535

[SP 139] IP Shadow LO

Units:	N/A
Minimum:	0 (.0 .0)
Maximum:	65535 (255.255)
Default:	65535

[SP 140] Meter 1 Output Type

Units:	N/A
Minimum:	1
Maximum:	2
Default:	1

Selections:

1 =	Voltage Output
2 =	Current Output

Meter 1 Output Type sets the type of signal generated by the controller for the Meter 1 Output (P2-1 P2-2). The signal is scaled with [SP 142] through [SP 145].

[SP 141] Meter 1 Signal Select

Units:	N/A
Minimum:	1
Maximum:	12
Default:	1

Selections:

1 =	Load Voltage A
2 =	Load Current A
3 =	Load Voltage B
4 =	Load Current B
5 =	Load Voltage C
6 =	Load Current C
7 =	Real Power
8 =	Apparent Power
9 =	Direct Out [SP 146]
10 =	Load Resistance A
11 =	Load Resistance B
12 =	Load Resistance C

[SP 142] Meter 1 Command Lo Value

Units:	% (Based on Full Scale value for the Signal selected)
Minimum:	0.00
Maximum:	100.00
Default:	0.00

This sets the value, in percent of the Full Scale, corresponding to the selection for [SP 141] Meter 1 Signal Select that generates the output signal set by [SP 143] Meter 1 Signal Lo Output.

[SP 143] Meter 1 Signal Lo Output

Units:	V, mA
Minimum:	0.00
Maximum:	20.00
Default:	0.00

This sets the output signal level generated for Meter 1 out corresponding to the value determined by [SP 142] Meter 1 Command Lo Value.

[SP 144] Meter 1 Command Hi Value

Units:	N/A (Based on Full Scale value)
Minimum:	0.00
Maximum:	100.00
Default:	100.00

This sets the value, in percent of the Full Scale, corresponding to the selection for [SP 141] Meter 1 Signal Select that generates the output signal set by [SP 145] Meter 1 Signal Hi Output.

[SP 145] Meter 1 Signal Hi Output

Units:	V, mA
Minimum:	0.00
Maximum:	20.00
Default:	5.00

This sets the output signal level generated for Meter 1 out corresponding to the value determined by [SP 144] Meter 1 Command Hi Value.

[SP 146] Meter 1 Out Direct

Units:	V, mA
Minimum:	0.00
Maximum:	20.00
Default:	0.00

Use this parameter to set the Meter output signal level when [SP 141] Meter 1 Signal Select is set to 5 = Direct out.

[SP 147] Meter 2 Output Type

Units:	N/A
Minimum:	1
Maximum:	2
Default:	1
Selections:	
1 =	Voltage Output
2 =	Current Output

Meter 2 Output Type sets the type of signal generated by the controller for the Meter 2 Output (P2-3 P2-4). The signal is scaled with [SP 149] through [SP 152].

[SP 148] Meter 2 Signal Select

Units:	N/A
Minimum:	1
Maximum:	12
Default:	2
Selections:	
1 =	Load Voltage A
2 =	Load Current A
3 =	Load Voltage B
4 =	Load Current B
5 =	Load Voltage C
6 =	Load Current C
7 =	Real Power
8 =	Apparent Power
9 =	Direct Out [SP 153]
10 =	Load Resistance A
11 =	Load Resistance B
12 =	Load Resistance C

[SP 149] Meter 2 Command Lo Value

Units:	N/A (Based on Full Scale values)
Minimum:	0.00
Maximum:	100.00
Default:	0.00

This sets the value, in percent of the Full Scale, corresponding to the selection for [SP 148] Meter 2 Signal Select that generates the output signal set by [SP 150] Meter 2 Signal Lo Output.

[SP 150] Meter 2 Signal Lo Output

Units:	V, mA
Minimum:	0.00
Maximum:	20.00
Default:	0.00

This sets the output signal level generated for Meter 3 out corresponding to the value determined by [SP 149] Meter 2 Command Lo Value.

[SP 151] Meter 2 Command HI Value

Units:	N/A (Based on Full Scale values)
Minimum:	0.00
Maximum:	100.00
Default:	100.00

This sets the value, in percent of the Full Scale, corresponding to the selection for [SP 148] Meter 2 Signal Select that generates the output signal set by [SP 152] Meter 2 Signal Hi Output.

[SP 152] Meter 2 Signal HI Output

Units:	V, mA
Minimum:	0.00
Maximum:	20.00
Default:	5.00

This sets the output signal level generated for Meter 2 out corresponding to the value determined by [SP 151] Meter 2 Command HI Value.

[SP 153] Meter 2 Out Direct

Units:	V, mA
Minimum:	0.00
Maximum:	20.00
Default:	0.00

Use this parameter to set the Meter output signal level when [SP 148] Meter 2 Signal Select is set to 5 = Direct out.

[SP 154] Load Resistance Maximum (Retransmit Scaling)

Units:	Ohm
Minimum:	0.00
Maximum:	650.00
Default:	50.00

Set the value for this parameter to the approximate maximum expected resistance of the load when the selection for one of the Meter outputs [SP 141], [SP 148] is set for Load Resistance. This value equates to the Meter Signal HI Output value [SP 145], [SP 152].

[SP 155] PWM Input LO Duty Cycle

Units:	%
Minimum:	0.00
Maximum:	100.00
Default:	0.00

[SP 156] PWM Input LO Command Output

Units:	%
Minimum:	0.00
Maximum:	100.00
Default:	0.00

[SP 157] PWM Input HI Duty Cycle

Units:	%
Minimum:	0.00
Maximum:	100.00
Default:	100.00

[SP 158] PWM Input HI Command Output

Units:	%
Minimum:	0.00
Maximum:	100.00
Default:	100.00

[SP 159] Reserved

Reserved

[SP 160] Transducer MAC ID (CCI Link Server Node)

Units:	N/A
Minimum:	0 (NONE)
Maximum:	63
Default:	0

[SP 161] Transducer Feedback Select

Units:	N/A
Minimum:	1
Maximum:	9
Default:	1
Selection:	
1 =	V1
2 =	I1
3 =	V2
4 =	I2
5 =	V3
6 =	I3
7 =	P1
8 =	P2
9 =	P3

[SP 162] Transducer Feedback Timeout Action Available on Single Phase Controllers Only

Units:	N/A
Minimum:	0
Maximum:	2
Default:	2
Selections:	
0 =	NONE, continue
1 =	STOP, fault shutdown
2 =	Use Internal Feedback [SP-19 = 1]

[SP 163 - 199] Reserved

Reserved

Monitor Parameters

User List, Range: 200 to 389

[MP 200] Active Setpoint	
Units:	N/A
Minimum:	1
Maximum:	14
Representation:	
1 =	S1 Analog Input 1
2 =	S1 Analog Input 2
3 =	S1 Fieldbus Setpoint
4 =	S1 Keypad Setpoint
5 =	S1 PWM Setpoint
6 =	S1 FBU Setpoint
7 =	S1 EE Setpoint
8 =	S2 Analog Input 1
9 =	S2 Analog Input 2
10 =	S2 Fieldbus Setpoint
11 =	S2 Keypad Setpoint
12 =	S2 PWM Setpoint
13 =	S2 FBU Setpoint
14 =	S2 EE Setpoint

[MP 201] PWM Setpoint	
Units:	%
Minimum:	-100.00
Maximum:	100.00

[MP 202] Analog Input 1	
Units:	% (Based on Full Scale Values)
Minimum:	-100.00
Maximum:	100.00

[MP 203] Analog Input 1 Command Value	
Units:	V, A, W
Format:	±xxxxx.x

[MP 204] Analog Input 1 Signal	
Units:	V, mA
Format:	±xx.xx

[MP 205] Analog Input 2	
Units:	% (Based on Full Scale values)
Minimum:	-100.00
Maximum:	100.00

[MP 206] Analog Input 2 Command Value	
Units:	V, A, W
Format:	±xxxxx.x

[MP 207] Analog Input 2 Signal	
Units:	V, mA
Format:	±xx.xx

[MP 208] Analog Input 1 Monitor Value	
Units:	N/A
Format:	±xxxx.x

[MP 209] Analog Input 2 Monitor Value	
Units:	N/A
Format:	±xxxx.x

[MP 210] Inhibit Alarm Status	
Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxx
Representation:	
Bit:	
BIT 7 =	Watchdog Timeout
BIT 6 =	Memory Error (Not Active)
BIT 5 =	Network Timeout
BIT 4 =	I / O Power Supply Failure
BIT 3 =	Line Phase Loss
BIT 2 =	PLL Lock Loss
BIT 1 =	Heatsink Over-Temp
BIT 0 =	Current Trip

[MP 211] Controller Status	
Units:	N/A
Minimum:	0
Maximum:	6
Representation:	
0 =	Disabled
1 =	Enabled
2 =	Diagnostic
3 =	Calibration
4 =	Program Mode
5 =	Heater Bakeout
6 =	Load Fault Teach

[MP 212] Feedback Source Control Loop

Units:	N/A
Minimum:	1
Maximum:	4
Representation:	
1 =	Internal Feedback Signal (V I P)
2 =	Analog Input 1
3 =	Analog Input 2
4 =	Transducer Card

[MP 213] Digital I / O Status

Units:	N/A
Minimum:	0000_0000 = 0
Maximum:	1111_1111 = 255
Representation:	0 = Open/Not-Active 1 = Closed/Active
Bit:	
BIT 7 =	Not Used
BIT 6 =	Not Used
BIT 5 =	Not Used
BIT 4 =	Relay
BIT 3 =	Not Used
BIT 2 =	Not Used
BIT 1 =	GP I/O
BIT 0 =	Run/Stop - Reset

[MP 214 - 217] Reserved

Reserved

[MP 218] AC Line Phase

Units:	Coded: AC Line Phasing for Phases C, B
Minimum:	00 = Not Determined
Maximum:	EE

Phase	Positive	Negative
0 Degrees	1	9
30 Degrees	2	A
60 Degrees	3	B
90 Degrees	4	C
120 Degrees	5	D
150 Degrees	6	E

[MP 219] AC Line Frequency

Units:	Hz
Minimum:	0.0
Maximum:	99.9

[MP 220] Line Voltage A

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

[MP 221] Load Voltage A

Units:	Volts RMS or AVG
Minimum:	0.0
Maximum:	999.9

[MP 222] Load Current A

Units:	Amps RMS or AVG
Minimum:	0.0
Maximum:	9999.9

[MP 223] Load Resistance A

Units:	Ohms
Minimum:	0.00
Maximum:	999.99

[MP 224] Heatsink Temperature

Units:	Degrees Celsius
Format:	+xxx.x

[MP 225] Line Voltage B

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

[MP 226] Load Voltage B

Units:	Volts RMS or AVG
Minimum:	0.0
Maximum:	999.9

[MP 227] Load Current B

Units:	Amps RMS or AVG
Minimum:	0.0
Maximum:	9999.9

[MP 228] Load Resistance B

Units:	Ohms
Minimum:	0.00
Maximum:	999.99

[MP 229] Reserved

Reserved

[MP 230] Line Voltage C

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

[MP 231] Load Voltage C

Units:	Volts RMS or AVG
Minimum:	0.0
Maximum:	999.9

[MP 232] Load Current C

Units:	Amps RMS or AVG
Minimum:	0.0
Maximum:	9999.9

[MP 233] Load Resistance C

Units:	Ohms
Minimum:	0.00
Maximum:	999.99

[MP 234] Reserved

Reserved	
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[MP 235] Load Current A

Units:	Amps RMS or Average
Minimum:	0.00
Maximum:	999.99

[MP 236] Load Current B

Units:	Amps RMS or Average
Minimum:	0.00
Maximum:	999.99

[MP 237] Load Current C

Units:	Amps RMS or Average
Minimum:	0.00
Maximum:	999.99

[MP 238] Load Current A

Units:	Amps RMS or Average
Minimum:	0.00
Maximum:	99.999

[MP 239] Load Current B

Units:	Amps RMS or Average
Minimum:	0.00
Maximum:	99.999

[MP 240] Load Current C

Units:	Amps RMS or Average
Minimum:	0.00
Maximum:	99.999

[MP 241, 242] Load Power, Hi-Res HI/LO

Units:	Watts or VA
Minimum:	0.00
Maximum:	9999999.99

These two parameters are concatenated to be the value.

[MP 243-244] Reserved

Reserved	
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[MP 245] Load Power HI (MSW)

Units:	Watts or VA
Minimum:	0
Maximum:	32767

[MP 246] Load Power LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

[MP 247] Line Power Factor

Units:	N/A
Minimum:	0.00
Maximum:	9.99

[MP 248] Controller State

Units:	N/A
Minimum:	0
Maximum:	3
Representation:	
0 =	STOP
1 =	RUN
2 =	FAULT
3 =	FAULT RESET

[MP 249] Output Duty Cycle %	
Units:	% of Full ON
Minimum:	0.0
Maximum:	999.9

[MP 250] Setpoint Reference HI (MSW)	
Units:	Volts, Amps, Watts
Minimum:	-99
Maximum:	99

[MP 251] Setpoint Reference LO (LSW)	
Units:	Volts, Amps, Watts
Minimum:	0
Maximum:	65535

[MP 252] Feedback HI (MSW)	
Units:	Volts, Amps, Watts
Minimum:	-99
Maximum:	99

[MP 253] Feedback LO (LSW)	
Units:	Volts, Amps, Watts
Minimum:	0
Maximum:	65535

[MP 254] Control Loop Error HI (MSW)	
Units:	Volts, Amps, Watts
Minimum:	-99
Maximum:	99

[MP 255] Control Loop Error LO (LSW)	
Units:	Volts, Amps, Watts
Minimum:	0
Maximum:	65535

[MP 256] Warning Alarm Status	
Units:	N/A
Range:	0 to 4095
Binary Display Format:	xxxxxxxxxxxx
Representation:	
Bit:	
BIT 12 =	Partial Load Fault
BIT 11 =	Missed SCR Firing pulse detected
BIT 10 =	Network Timeout
BIT 9 =	Deviation
BIT 8 =	Output % High or Tap Change Up
BIT 7 =	Output % Low or Tap Change Down
BIT 6 =	Low Output

[MP 256] Warning Alarm Status	
BIT 5 =	Load Imbalance
BIT 4 =	Shorted SCR
BIT 3 =	Heatsink Temperature
BIT 2 =	Power Limit
BIT 1 =	Current Limit
BIT 0 =	Voltage Limit

[MP 257] Load Power Factor	
Units:	N/A
Minimum:	0
Maximum:	9.99

[MP 258 - 259] Reserved	
Reserved	

Parameters MP 260 to 295 are available on Single Phase controllers only

[MP 260, 261] Transducer Ch.1 Voltage HI/LO

Units:	Volts
Representation:	xxxx.xxx

These two parameters are concatenated to be the value of the signal connected to the input of channel 1.

[MP 262, 263] Transducer Ch.1 Current HI/LO

Units:	Amps
Representation:	xxxxx.x

These two parameters are concatenated to be the value of the signal connected to the input of channel 2.

[MP 264, 265] Transducer Ch.2 Voltage HI/LO

Units:	Volts
Representation:	xxxx.xxx

These two parameters are concatenated to be the value of the signal connected to the input of channel 3.

[MP 266, 267] Transducer Ch.2 Current HI/LO

Units:	Amps
Representation:	xxxxx.x

These two parameters are concatenated to be the value of the signal connected to the input of channel 4.

[MP 268, 269] Transducer Ch.3 Voltage HI/LO

Units:	Volts
Representation:	xxxx.xxx

These two parameters are concatenated to be the value of the signal connected to the input of channel 5.

[MP 270, 271] Transducer Ch.3 Current HI/LO	
Units:	Amps
Representation:	xxxxx.x
These two parameters are concatenated to be the value of the signal connected to the input of channel 6.	

[MP 272, 273] Transducer Power Ch.1 HI/LO	
Units:	Watts
Representation:	xxxxxxxx
These two parameters are concatenated to be the value for power calculated from the signals connected to channels 1 and 4.	

[MP 274, 275] Transducer Power Ch.2 HI/LO	
Units:	Watts
Representation:	xxxxxxxx
These two parameters are concatenated to be the value for power calculated from the signals connected to channels 2 and 5.	

[MP 276, 277] Transducer Power Ch.3 HI/LO	
Units:	Watts
Representation:	xxxxxxxx
These two parameters are concatenated to be the value for power calculated from the signals connected to channels 3 and 6.	

[MP 278] Transducer Digital I/O	
Units:	N/A
Minimum:	00000000 = 0
Maximum:	00001111 = 15
Representation:	
Bit:	
BIT 7 =	not used
BIT 6 =	not used
BIT 5 =	not used
BIT 4 =	not used
BIT 3 =	Digital Input 4 state
BIT 2 =	Digital Input 3 state
BIT 1 =	Digital Input 2 state
BIT 0 =	Digital Input 1 state

[MP 279] Transducer Channel Status	
Units:	N/A
Minimum:	00000000 = 0
Maximum:	00111111 = 63
Representation:	
Bit:	
BIT 7 =	not used
BIT 6 =	not used
BIT 5 =	CH 6 overload

[MP 279] Transducer Channel Status	
BIT 4 =	CH 5 overload
BIT 3 =	CH 4 overload
BIT 2 =	CH 3 overload
BIT 1 =	CH 2 overload
BIT 0 =	CH 1 overload

[MP 280] Transducer AC Line Timing/Status	
Units:	N/A
Minimum:	00000000 = 0
Maximum:	00111111 = 63
Representation:	
Bit:	
BIT 7 =	not used
BIT 6 =	not used
BIT 5 =	Sync signal connection detected
BIT 4 =	Cycle time determined
BIT 3 =	ADC same clock timing = OK
BIT 2 =	Synchronized, Locked-in
BIT 1 =	Synchronization stage 2 pass
BIT 0 =	Synchronization stage 1 pass

[MP 281] Transducer Full Scale Ch.1 Voltage	
Units:	Volts
Representation:	xxx.x

[MP 282] Transducer Full Scale Ch.1 Current	
Units:	Amps
Representation:	xxxx

[MP 283] Transducer Full Scale Ch.2 Voltage	
Units:	Volts
Representation:	xxx.x

[MP 284] Transducer Full Scale Ch.2 Current	
Units:	Amps
Representation:	xxxx

[MP 285] Transducer Full Scale Ch.3 Voltage	
Units:	Volts
Representation:	xxx.x

[MP 286] Transducer Full Scale Ch.3 Current	
Units:	Amps
Representation:	xxxx

[MP 287, 288] Transducer Full Scale Power Ch.1

MP 287:	MSW
MP 288:	LSW
Units:	Watts or Volt-Amps
Representation:	xxxxxxx

[MP 289, 290] Transducer Full Scale Power Ch.2

MP 289:	MSW
MP 290:	LSW
Units:	Watts or Volt-Amps
Representation:	xxxxxxx

[MP 291, 292] Transducer Full Scale Power Ch.3

MP 291:	MSW
MP 292:	LSW
Units:	Watts or Volt-Amps
Representation:	xxxxxxx

[MP 293] Transducer Firmware ID

Units:	N/A
Representation:	xxxxx

[MP 294, 295] Transducer Serial # HI/LOW

MP 294:	MSW
MP 295:	LSW
Units:	N/A
Representation:	xxxxxxxxxxx

[MP 296 - 302] Reserved

Reserved	
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[MP 303, 304] kVAh Consumption

MP 303:	MSW
MP 304:	LSW
Units:	kVAh
Format:	+xxxxxxxxx.x

[MP 305, 306] kWh Consumption

MP 305:	MSW
MP 306:	LSW
Units:	kWh
Format:	+xxxxxxxxx.x

[MP 307] Power-up Count

Units:	Counts
Minimum:	0
Maximum:	65535

[MP 308] Low Power Count

Units:	Counts
Minimum:	0
Maximum:	65535

[MP 309, 310] In Service Time

MP 309:	MSW
MP 310:	LSW
Units:	Hour
Format:	+xxxxxxxxx.x

[MP 311 - 321] Reserved

Reserved	
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[MP 322] USB Status

Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 7 =	CRC Error
BIT 6 =	Not Used
BIT 5 =	Not Used
BIT 4 =	Not Used
BIT 3 =	Parity Error
BIT 2 =	Framing Error
BIT 1 =	Receive Buffer Overrun
BIT 0 =	Address received, Message Error encountered

[MP 323] Network Status (CCI Link)

Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 7 =	Bus OFF State
BIT 6 =	Bus Passive State
BIT 5 =	Duplicate MAC ID Detected
BIT 4 =	Connection Timeout
BIT 3 =	Cyclic Connection Established
BIT 2 =	Reserved
BIT 1 =	Explicit Connection Established
BIT 0 =	ON Line

[MP 324] Slave Connection Status (CCI Link)

Units:	N/A
Range:	0 to 4095
Binary Display Format:	xxxxxxxxxxxx
Representation:	
Bit:	
BIT 11 =	Connection 3 Timeout
BIT 10 =	Connection 3 Cyclic or Poll
BIT 9 =	Connection 3 Explicit
BIT 8 =	Connection 3 Allocated/ Connected
BIT 7 =	Connection 2 Timeout
BIT 6 =	Connection 2 Cyclic or Poll
BIT 5 =	Connection 2 Explicit
BIT 4 =	Connection 2 Allocated/ Connected
BIT 3 =	Connection 1 Timeout
BIT 2 =	Connection 1 Cyclic or Poll
BIT 1 =	Connection 1 Explicit
BIT 0 =	Connection 1 Allocated/ Connected

[MP 325] Master Connection Status (CCI Link)

Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxxxxxx
Representation:	
Bit:	
BIT 7 =	Connection 2 Timeout
BIT 6 =	Connection 2 Established/Active
BIT 5 =	Connection 1 Timeout
BIT 4 =	Connection 1 Established/Active
BIT 3 =	Connection Failure
BIT 2 =	Configuration check in progress
BIT 1 =	On-Line, communicating
BIT 0 =	Slave Detection

[MP 326] Comm Status (Comm. Module)

Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxxxxxx
Representation:	
Bit:	
BIT 7 =	Heartbeat Timer Timeout
BIT 6 =	Module Not Responding = Timeout
BIT 5 =	Module Reset

[MP 326] Comm Status (Comm. Module)

BIT 4 =	IP Address Query
BIT 3 =	Configuration Error
BIT 2 =	Configuration Mode
BIT 1 =	IP Address is set correctly
BIT 0 =	Communicating (Active)

[MP 327, 328] EE Calibration Bits, Stored

MP 327:	MSW
MP 328:	LSW
Units:	ADC Bits
Format:	±xxxxxxxxxxx

[MP 329, 330] Live Calibration Bits In, Live

MP 329:	MSW
MP 330:	LSW
Units:	ADC Bits
Format:	±xxxxxxxxxxx

[MP 331] Firmware ID

Units:	N/A
Minimum:	0
Maximum:	65535

[MP 332] Firmware Version

Units:	N/A
Format:	+xx.xx.xx

[MP 333] Minor Revision (Appended to Firmware Version)

Units:	N/A
Format:	+xx

NOTE: Firmware version [MP 332, 333] format XX.XX.xx (Maximum: 99.99.99)

[MP 334] Reserved

Reserved

[MP 335] Misc. Status

Units:	N/A
Range:	0 to 2045
Binary Display Format:	xxxxxxxxxxxx
Representation:	
Bit:	
BIT 15 =	Not Used
BIT 14 =	Not Used
BIT 13 =	Not Used
BIT 12 =	Not Used
BIT 11 =	Display connected

[MP 335] Misc. Status

BIT 10 =	HiPER, Phase Angle firing
BIT 9 =	HiPER firing
BIT 8 =	Initialization in progress (0 = finished = ready)
BIT 7 =	Load Trace is ON, Collecting Data
BIT 6 =	AC Line Trace is ON, Collecting Data
BIT 5 =	Load Trace is Enabled, waiting for Trigger
BIT 4 =	AC Line Trace is Enabled, Waiting for Trigger
BIT 3 =	Waiting for the Enter Key During Initialization
BIT 2 =	USER UNlock, Access Code Successfully Entered
BIT 1 =	Not Used
BIT 0 =	MFG UNlock, Access Code Successfully Entered

[MP 336] EEPROM Status

Units:	N/A
Range:	0 to 6143
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 15 =	Not Used
BIT 14 =	Not Used
BIT 13 =	EEPROM SP Definition Table Update
BIT 12 =	EEPROM is Write Protected
BIT 11 =	Backup User SP V-Table Checksum Failure
BIT 10 =	Not Used
BIT 9 =	Not Used
BIT 8 =	Repair Record Checksum Failure
BIT 7 =	Error Code Record Checksum Failure
BIT 6 =	MFG Data Table Checksum Failure
BIT 5 =	Calibration Data Table Checksum Failure
BIT 4 =	CAL Parameter V-Table Checksum Failure
BIT 3 =	MFG SP V-Table Checksum Failure
BIT 2 =	User SP V-Table Checksum Failure
BIT 1 =	Blank, Initialization Required
BIT 0 =	Read/Write Failure

[MP 337 - 341] Reserved

Reserved

[MP 342] AC Line Status

Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 7 =	Feedback ADC Timing OK
BIT 6 =	Control Loop Timing OK
BIT 5 =	Phase Rotation 3-2-1 (0 = Phase Rotation 1-2-3)
BIT 4 =	Phase Rotation Determined (Three Phase)
BIT 3 =	Not Used
BIT 2 =	Line Voltage C Present
BIT 1 =	Line Voltage B Present
BIT 0 =	Line Voltage A Present

[MP 343] Load Status

Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 7 =	Not Used
BIT 6 =	Open Load C
BIT 5 =	Open Load B
BIT 4 =	Open Load A
BIT 3 =	Not Used
BIT 2 =	Shorted SCR C
BIT 1 =	Shorted SCR B
BIT 0 =	Shorted SCR A

[MP 344] Zone Status

Units:	N/A
Range:	0 to 16
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 15 to 5 =	Not Used
BIT 4 =	Zone 1: (0 = Not at Setpoint, 1 = at Setpoint)
BIT 3 =	Not Used
BIT 2 =	Not Used
BIT 1 =	Not Used
BIT 0 =	Zone 1: (0 = Normal, 1 = FAULT)

[MP 345] Error Latch	
Units:	N/A
Range:	0 to 31 (31 = 001F _h)
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 15 - 8 =	Reserved
BIT 7 =	SCR firing interrupt failed
BIT 6 =	SCR Fire output failed
BIT 5 =	Missed SCR Firing Pulse detected
BIT 4 =	ADC/DMA Feedback "Re-Sync" performed
BIT 3 =	AC Line "Re-Syn" performed
BIT 2 =	AC Line Frequency check failure
BIT 1 =	Phase Loss or Missing AC Line cycle detected
BIT 0 =	AC Line Phase Lock Loss

[MP 346] Alarms	
Units:	N/A
Range:	0 to 65535 (0000 to FFFF _h)
Hex. Format:	xxxx
Representation:	
Bit:	
BIT 15 =	I / O Power Supply failure
BIT 14 =	Watchdog Timeout
BIT 13 =	Output % High or Tap Change Up
BIT 12 =	Output % Low or Tap Change Down
BIT 11 =	Line Phase Loss
BIT 10 =	PLL Lock Loss
BIT 9 =	Heatsink Over Temp
BIT 8 =	Current Trip
BIT 7 =	Deviation
BIT 6 =	Low Output (at MAX Output)
BIT 5 =	Load Imbalance
BIT 4 =	Shorted SCR
BIT 3 =	Heatsink Close to Over Temp
BIT 2 =	Power Limiting
BIT 1 =	Current Limiting
BIT 0 =	Voltage Limiting

[MP 347] Missed SCR Firing Pulse Count	
Units:	Counts
Minimum:	0
Maximum:	65535

[MP 348] Network Message Error Count (CCI Link)	
Units:	Counts
Minimum:	0
Maximum:	65535

[MP 349] Firmware Update Code	
Units:	N/A
Minimum:	0
Maximum:	65535

[MP 350 - 359] Reserved	
Reserved	

[MP 360] Load Fault Target Resistance A	
Units:	Ohm
Minimum:	0.00
Maximum:	+xxx.xx

[MP 361] Load Fault Target Resistance B	
Units:	Ohm
Minimum:	0.00
Maximum:	+xxx.xx

[MP 362] Load Fault Target Resistance C	
Units:	Ohm
Minimum:	0.00
Maximum:	+xxx.xx

[MP 363] Load Fault Resistance Deviation A	
Units:	%
Minimum:	0.0
Maximum:	100.0

[MP 364] Load Fault Resistance Deviation B	
Units:	%
Minimum:	0.0
Maximum:	100.0

[MP 365] Load Fault Resistance Deviation C	
Units:	%
Minimum:	0.0
Maximum:	100.0

[MP 366] Load Fault Resistance A	
Units:	Ohm
Minimum:	0
Maximum:	999.99
Format:	+xxx.xx

[MP 367] Load Fault Resistance B	
Units:	Ohm
Minimum:	0
Maximum:	999.99
Format:	+xxx.xx

[MP 368] Load Fault Resistance C	
Units:	Ohm
Minimum:	0
Maximum:	999.99
Format:	+xxx.xx

[MP 369] Partial Load Fault Status	
Units:	N/A
Range:	0 to (32767 = 7FFF _h)
Binary Display Format:	xxxxxxxxxxx
Representation:	
Bit:	
BIT 15 =	Not Used
BIT 14 =	Not Used
BIT 13 =	Not Used
BIT 12 =	Not Used
BIT 11 =	Partial Load Fault C
BIT 10 =	Partial Load Fault B
BIT 9 =	Partial Load Fault A
BIT 8 =	Out of Range C
BIT 7 =	Out of Range B
BIT 6 =	Out of Range A
BIT 5 =	Teach - determining MIN setpoint
BIT 4 =	Teach in progress
BIT 3 =	Teach enabled
BIT 2 =	Ramp Initialized
BIT 1 =	Ramp Mode
BIT 0 =	Enabled

[MP 370] Network Heartbeat Timer	
Units:	Seconds
Minimum:	0
Maximum:	65535

[MP 371, 372] Heater Bakeout Time Remaining	
MP 371:	MSW
MP 372:	LSW
Units:	Minutes
Minimum:	0.00
Maximum:	10000.00

[MP 373] Communications Watchdog Timer	
Units:	Seconds
Minimum:	0
Maximum:	65535

[MP 374 - 377] Reserved	
Reserved	

[MP 378] EEPROM Status 2	
Units:	N/A
Range:	0 to 255
Binary Display Format:	xxxxxxxx
Representation:	
Bit:	
BIT 7 =	User Backup XP Table 2 checksum error
BIT 6 =	User Backup XP Table 1 checksum error
BIT 5 =	MFG XP Table 2 Checksum error
BIT 4 =	MFG XP Table 1 Checksum error
BIT 3 =	XP Table 2 checksum error
BIT 2 =	XP Table 1 checksum error
BIT 1 =	XP Definition table 2 error
BIT 0 =	XP Definition table 1 error

[MP 379] Bootloader Version	
Units:	N/A
Minimum:	1.00
Maximum:	99.99

[MP 380] PGA Gain AC Line	
Units:	N/A
Minimum:	1
Maximum:	32

[MP 381] PGA Gain Load Voltage	
Units:	N/A
Minimum:	1
Maximum:	32

[MP 382] Load Voltage Range	
Units:	N/A
Minimum:	1
Maximum:	3

Special Function Parameter List, (XP) Range: 3400 - 3412

[MP 383 - 384] Reserved

Reserved

[MP 385] PGA Gain Load Current

Units:	N/A
Minimum:	1
Maximum:	32

[MP 386 - 388] Reserved

Reserved

[MP 389] PGA Gain Message Count

Units:	AC Line 1/2 Cycles
Minimum:	0
Maximum:	65535

[XP 3400] Digital RUN/STOP Configuration

Units:	N/A
Minimum:	0
Maximum:	2
Default:	1
Selections:	
0 =	Never use Digital RUN/Stop, use switch
1 =	Analog use switch only, Digital use Digital RUN/Stop and switch
2 =	Always use Digital RUN/Stop and switch

[XP 3401] Digital RUN/Stop Power-Up Default

Units:	N/A
Minimum:	0
Maximum:	1
Default:	0
Selections:	
0 =	STOP
1 =	RUN

[XP 3402] Output % High Alarm Threshold

Units:	%
Minimum:	0.00
Maximum:	100
Default:	100

[XP 3403] Output % Low Alarm Threshold

Units:	%
Minimum:	0
Maximum:	100
Default:	0

[XP 3404 - 3409] Reserved

Reserved

[XP 3410] High/Low Out % Alarm Display Text Select

Units:	N/A
Minimum:	1
Maximum:	2
Default:	1
Selections:	
1 =	Out % High / Low
2 =	Tap Change Up / Down

[XP 3411] Reserved

Reserved

[XP 3412] Missed SCR Firing Pulse Detection Enable

Units:	N/A
Minimum:	0
Maximum:	1
Default:	1
Selections:	
0 =	OFF (Disabled)
1 =	ON (Enabled)